



Winter CTE Director Meeting

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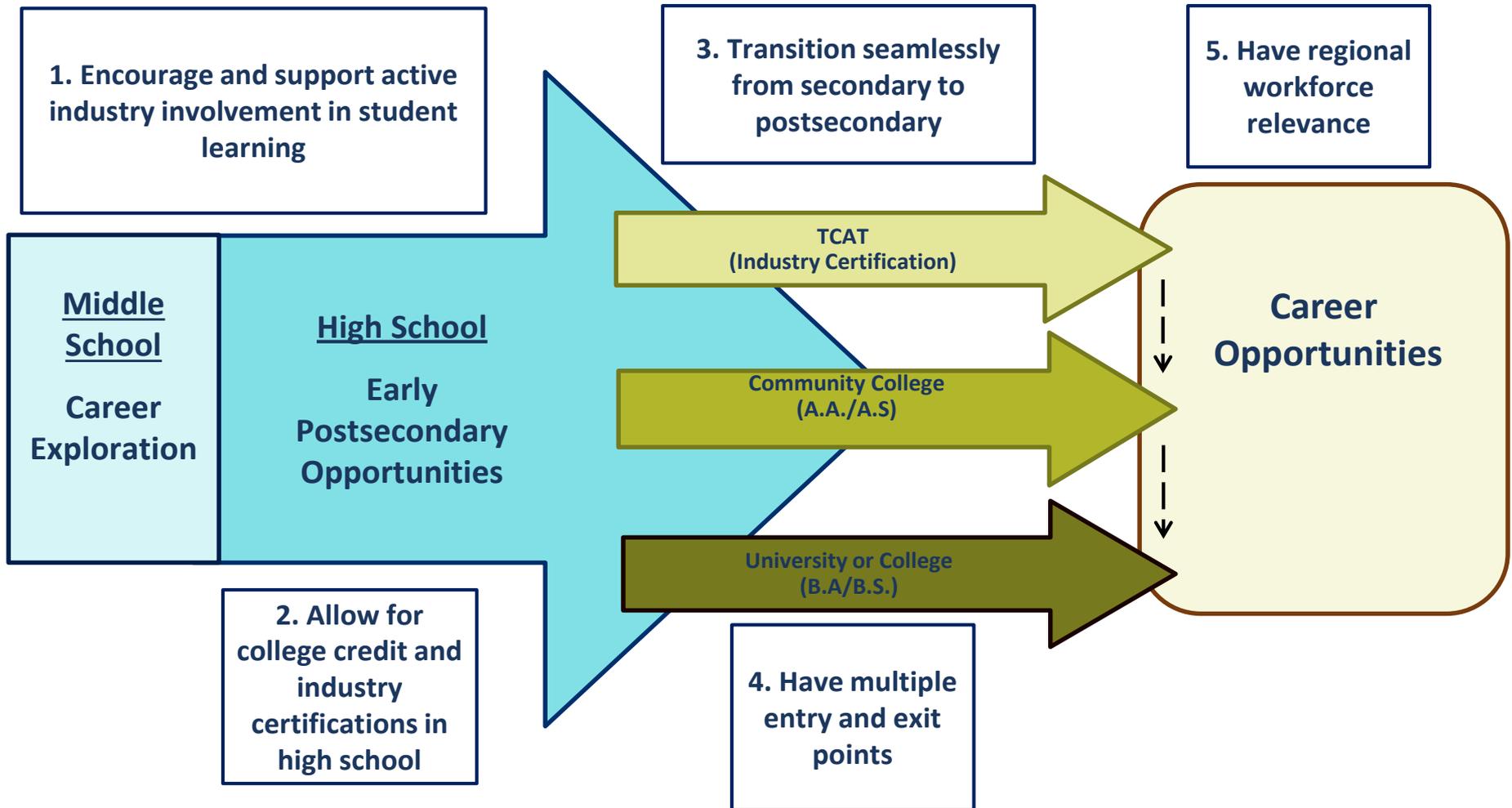
Building Comprehensive Programs of Study to Support Student Success

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Success in the New Economy



Pathways Framework



Seamless Transitions

Elementary & Middle School

Career awareness and exploration

Recruitment of students into programs

High School *Mechatronics* Program of Study

Capstone Work-Based Learning Experience

Industry Certification

Machining Level I - Measurement, Materials, and Safety Certification (NIMS)

Siemens Level 1 Certified Mechatronic Systems Assistant

Early Postsecondary

Dual credit/enrollment: Motlow State Community College

Certificate

Industry Certification

Siemens Level 2 Certified Mechatronics Systems Associate

TCAT

Mechatronics Technician (TCAT Nashville)

Dyersburg Community College

Industrial Electricity Certificate

Mechanical Components I

Programmable Logic Controller I

Associates

A.S., Mechanical Pre-Engineering

Motlow State Community College

A.S., Advanced Integrated Technology

Columbia State Community College

Bachelors

B.S., Mechatronics Engineering

Middle Tennessee State University

B.S., Mechanical Engineering

Middle Tennessee State University

High School Diploma

- Industrial Machining Mechanic (\$51,300)

Certificate

- Industrial Engineering Technician (\$53,110)
- Electromechanical Technician (\$58,540)

Associates

- Industrial Engineering Technologist (\$61,900)
- Electromechanical Technologist (\$61,900)

Bachelors

- Mechatronic Engineers (\$76,300)
- Mechanical Engineer (\$85,060)
- Industrial Engineer (\$80,270)

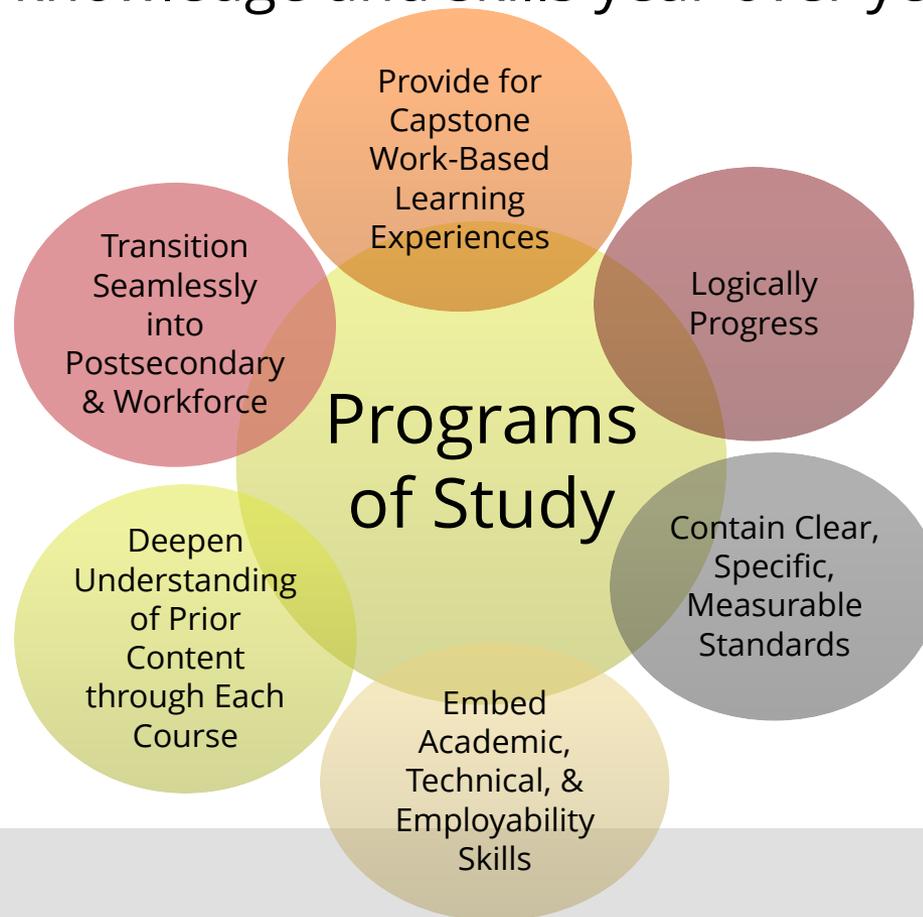


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Programs of Study

Anatomy of a Program of Study

- Tennessee's programs of study are meant to provide a relevant framework of industry-aligned, rigorous courses that progress a student in knowledge and skills year over year.



Anatomy of a Program of Study

Program of Study	Level 1	Level 2	Level 3	Level 4
Mechatronics	Principles of Manufacturing (5922)	Digital Electronics (5925) Or Robotics & Automated Systems (6143) Or Project Lead the Way (PLTW) Computer Integrated Manufacturing (6055)	Mechatronics I ¹ (6156) -or- Dual Enrollment Mechatronics (4063)	Mechatronics II ¹ (6157) -or- Manufacturing Practicum (5926) -or- Dual Enrollment Mechatronics (4063)
	Industry Certification: Machining Level I - Measurement, Materials, and Safety Certification (NIMS)			Industry Certification: Level 1 Siemens Certified Mechatronic Systems Assistant

How are you feeling this morning?

I'm ready to
conquer the world!

Meh

Where's the coffee?

I need toothpicks

keep my eyes

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Backwards Mapping Jobs to Programs of Study

- **Job Name:** Industrial Maintenance Technician
- **Job Description:** Performs preventative, corrective, and emergent maintenance, and assists with the collection of predicative maintenance data for analysis.
 - Set up and operate machining tools such as lathe, milling machine, drill press, grinders, alter or construct replacement parts, recondition production tooling. Maintain, install, troubleshoot, and repair the following: programmable logic controllers, AC & DC motors, transformers and rectifiers, industrial electronic and control systems, logic panels including hard relays, timers and counters
- What program of study would best prepare students for this job?

Program of study would best prepare students for job?

Electromechanical
Technology

Mechatronics

Machining
Technology

Welding

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Electromechanical Technology

Description

The *Electromechanical Technology* program of study is designed to provide students with the knowledge and skills to effectively perform basic **industrial maintenance** procedures in an advanced manufacturing facility. This program of study is designed for students that are interested in becoming: a general maintenance and repair worker, industrial machinery mechanic, master mechanic, electromechanical technician, mechanical engineer, or an electromechanical engineer. Course content focuses on the electromechanical domains, including: fundamental safety practices in electromechanical technology, shielded metal arc welding (SMAW), basic metal inert gas (MIG) welding, electrical systems, AC and DC motors, calibrating instruments, drive systems, pipe fabrication, hydraulic systems, pumps, digital electronics, programmable logic controllers (PLC), and troubleshooting procedures. Upon completion of this POS, proficient students will be prepared to pursue postsecondary electromechanical technology programs and entry-level **industrial maintenance** technology careers in the advanced manufacturing industry.

Backwards Mapping Jobs to Programs of Study

- **Job Name:** Metal Fabricator
- **Job Description:** Fabricate, position, align, and fit parts of structural metal product
- What program of study would best prepare students for this job?
- Answer via the survey!

Program of study would best prepare students
for metal fabricator job?

Electromechanical
Technology
Machining
Technology
Mechatronics

Welding

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Backwards Mapping Jobs to Programs of Study

Skills

1. adhere to safety procedures
2. align or adjust clearances of mechanical components or parts
3. build or repair structures in construction, repair, or manufacturing setting
4. construct patterns or templates for welding projects
5. fabricate sheet metal parts or items
6. fabricate, assemble, or disassemble manufactured products by hand
7. file, sand, grind, or polish metal or plastic objects
8. identify base metals for welding
9. identify properties of metals for repair or fabrication activities
10. make independent judgment in assembly procedures

Case Study

- Ready County
- NW Tennessee
- One high school in the county
- 1,100 students in the high school (grades 9-12)

- At your tables answer the following questions
- 1) What programs of study will you offer?
 - Select only three

What programs of study should Ready County of

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Case Study

Ready County should offer the following programs of study:

- *Electromechanical Technology*
 - Advanced Manufacturing
- *Distribution & Logistics*
 - Transportation, Distribution, & Logistics
- *Therapeutic Services*
 - Health Science

Other options:

- *Nursing Services*
 - Health Science
- *Machining Technology*
 - Advanced Manufacturing
- *Teaching as a Profession*
 - Education & Training
- *Social Health*
 - Human Services

Why only three programs of study?

Case Study

- **Which jobs and employers supported this decision?**
- *Electromechanical Technology*
 - Advanced Manufacturing
- Industrial Engineering Technicians, Electrical Engineers, Mechanical Engineers, Team Assemblers, Computer Controlled Machine Tool Operators, Packaging and Filling Machine Operators, Kitchen & Bath Appliance Production Co., Electric Research And Manufacturing Co, NSK Steering Systems America, Inc., HEXPOL Compounding, LLC, MTD Products, Metal Door Manufacturing, Maclean Power Systems Manufacturing, Dana Corporation Automotive Manufacturing

Case Study

- **Which jobs and employers supported this decision?**
- *Distribution & Logistics*
 - Transportation, Distribution, & Logistics
- Freight Cargo Solutions, LLC, Doyle, Sims & Sons Trucking, Inc., Save-A-Lot Distribution Center, Transportation, Storage, and Distribution Managers, Lowe's Home Centers, LLC, Wal-Mart Stores, Inc., Truck drivers, Railroad conductors, Locomotive engineers

Case Study

- **Which jobs and employers supported this decision?**
- *Therapeutic Services*
 - Health Science
- Respiratory Therapists, Medical and Clinical Lab Technologists, Medical and Clinical Lab Technicians, Pharmacy Technicians, Ready Memorial Hospital, Neighbor County Regional Medical Center, East County Nursing Home, Health South Rehabilitation Hospital, Winfrey Nursing Center,

Case Study

Ready County should offer the following programs of study:

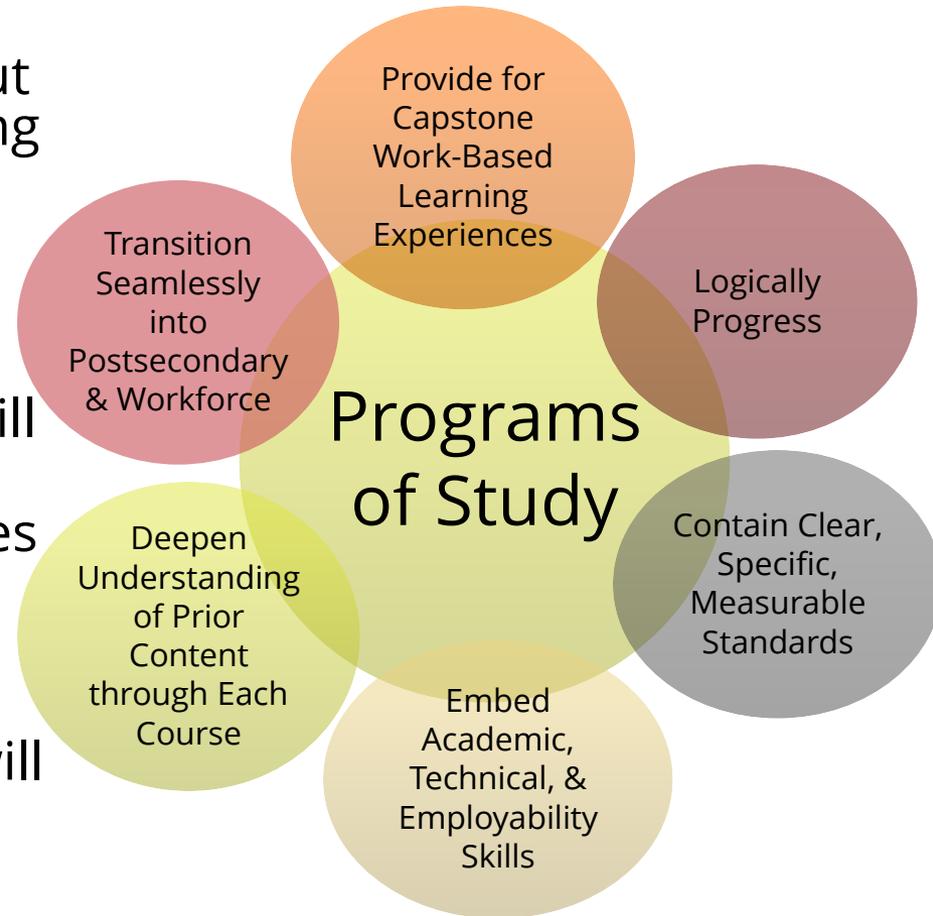
- *Electromechanical Technology*
 - Advanced Manufacturing
- *Distribution & Logistics*
 - Transportation, Distribution, & Logistics
- *Therapeutic Services*
 - Health Science

- Why not *Mechatronics*?
- Why not *Veterinary and Animal Science*?
- Why not *Office Management*?

Case Study

Remember our anatomy of a program of study? Let's answer the following questions to ensure we are building out our program and seamlessly connecting to postsecondary and industry!

- Based on the three programs of study,
 - 1) Which postsecondary institution will you partner with?
 - 2) Which postsecondary program does the program of study lead to?
 - 3) Which EPSO opportunities would you offer students?
 - 4) Which WBL capstone experience will you offer students?
 - 5) Who will be your industry partner?



Case Study

Advanced Manufacturing

Program of Study	Level 1	Level 2	Level 3	Level 4
Electromechanical Technology	Principles of Manufacturing (5922)	Introduction to Electromechanical (6091)	Advanced Electromechanical Technology (6090) -or- Dual Enrollment Electromechanical Technology (4061)	Manufacturing Practicum (5926) -or- Dual Enrollment Electromechanical Technology (4061)
	Industry Certification: Machining Level I - Measurement, Materials, and Safety Certification (NIMS)			

- 1) **Postsecondary institution:** TCAT McKenzie
- 2) **Aligned program:** Industrial electronics technology
- 3) **EPSOs:** Dual enrollment, industry certification
- 4) **Manufacturing Practicum**
- 5) **Industry Partner:** Electric Research And Manufacturing Co.

Case Study

Answer the following questions at your table for *Distribution & Logistics* and *Therapeutic Services* and be prepared to report out.

- Based on the three programs of study,
 - 1) Which postsecondary institution will you partner with?
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 - 3) Which EPSO opportunities would you offer students?
 - 4) Which WBL capstone experience will you offer students?
 - 5) Who will be your industry partner?



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Next Steps

Next Steps

- Conduct this process in your district to select your 2017-18 programs of study.
 - 2017-18 open enrollment period will **close on Feb. 23.**
 - If you have already selected your POS and not gone through process, **revise** your selections based on a regional analysis.

Resources (page two of Open Enrollment Guide):

- 2017-18 POS
- 2017-18 POS and course revisions document
- Labor market/industry data for your city, county, and region
 - Local chamber of commerce, Jobs4TN.gov, 2016 LEAP report
- TCAT and department of education program of study alignment



Districts and schools in Tennessee will exemplify excellence and equity such that all students are equipped with the knowledge and skills to successfully embark on their chosen path in life.

Excellence | Optimism | Judgment | Courage | Teamwork